
The Rate of Preterm Twin Births (22–27 Weeks) As a Criterion for Measuring the Quality of Prenatal Care

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While the true figures are not well established, outcomes of twin pregnancies are directly dependent on a small number of preterm births between 22 and 27 weeks. Observation of perinatal outcomes in twin pregnancies yields two contradictory results. Firstly, it shows an improvement in perinatal mortality figures. Secondly, it reveals an increase in the rates of preterm deliveries. These findings result from the observation of 783 twin pregnancies followed and delivered in a level 3 perinatal centre in Paris between 1993 and 1998. Women followed since the beginning of pregnancy through the outpatient clinic of the institution are included in this number, as are women who were referred or transferred to the centre at a later date due to complications. This analysis reflects the influence of two contrasting policies. The first, and less recent policy is devoted to the prevention of preterm births, and is reflected by the low number of extremely preterm deliveries at 22–32 weeks. The second is the effect of our new approach to the prevention of foetal deaths in relation to foetal growth retardation in twins which has resulted in increased medical intervention such as the induction of labour or scheduled Caesarean birth. This has resulted in an increase in twin preterm births from 33 to 36 weeks, with the expected result of fewer foetal deaths.

The outcome for newborns in twin pregnancies in terms of neonatal survival, neonatal severe morbidity and risk of cerebral palsy is directly dependent on a small proportion of extreme preterm births below 28 weeks, even more so than in singletons. For this reason, with twin pregnancies in particular, it is important to propose preventative preterm birth intervention as early as possible.

The only published effective reductions of adverse outcomes for twins are those which were successful in the reduction of very preterm twin births. (Osbourne & Patel, 1985; Papiernik, 1996). But the true figures for these extremely preterm births are not well established. In population based studies there is a low registration of very preterm births. This is even more obvious for still births, which are not considered as births for civil registration in many countries before 28 weeks. France, for example, only considers for still births, delivery at or after 28 weeks as a birth. Moreover, twinning may go unregistered if one birth is still, and the surviving baby is registered as a single birth (Kiely, 1998).

In hospital based data collection, the true rate of extreme preterm births between 22 and 27 weeks is not

easy to define, due to a possible bias. Departments which are known to publish work on twinning may have an increased percentage of referred cases thus affecting twin preterm figures; an adverse effect of the reputation of certain departments as being interested in twin pregnancies. Nevertheless, in hospital sites, the registration of all pregnancy losses is beginning earlier than 22 weeks, improving registration of overall twin deliveries (Chervenak, 1984).

The objective of this study is to measure the true rate of twin preterm births from 22–27 weeks gestation among all cases of twin pregnancies delivered in a teaching referral centre.

Patients and Methods

Twin pregnancies were studied retrospectively among women who gave birth at *Port Royal Maternity*, a teaching and level III referral centre carrying out 3500 births per year. At Port Royal Maternity, all pregnancy outcomes are registered from 15 weeks onwards. Three groups of mothers were recruited. Firstly, those followed since the beginning of the pregnancy including twin mothers followed by the local prenatal care system from before 20 weeks, and not belonging to the two other groups. Recruitment was on a voluntary basis, and constitutes about 2000 pregnancies per year. About 1000 other pregnant women were included at the request of their practitioner for specific reasons such as previous pregnancy loss, or current high-risk pregnancy such as twin pregnancy. The second group of women were referred to our centre for prenatal diagnosis and for whom their referring obstetricians decided that the follow-up should be at *Port Royal Maternity*. The third group were women transferred to the centre from another maternity-hospital in an emergency situation for intra-hospital care, in most cases for preterm labour or complication of pregnancy with high blood pressure. This department has a reputation for being interested in twins. Women who were admitted in an emergency situation to the hospital, but who were not followed, not referred or not transferred were not studied.

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Data are collected retrospectively until the point of delivery (or pregnancy loss). Obstetrical events are collected at the time of delivery. The later outcome for mothers and newborns is collected either after one month or at the later discharge date if the baby was admitted to the neonatal department of the hospital.

A team of trained obstetricians and midwives delivers the prenatal care for all subjects. One of the major goals of our prenatal care system is the prevention of preterm deliveries. For twin mothers specific proposals for prevention are offered. The most important proposal is for the reduction of physical activity and, if needed, a prescription of work leave at 22 weeks of pregnancy (Heluin, 1984; Papiernik, 1996). While no systematic hospital care is proposed, a home visit midwife is offered for some. Women are informed of the specific risk of preterm birth in twins. Time is taken to explain the physical characteristics of uterine contraction, as well as the need to avoid heavy work or physical exertion. Cerclage is not proposed unless there is a specific indication of an adverse history of late spontaneous abortion, or of a history of an unrelated preterm delivery.

Foetal growth is measured by ultrasound every month from 24 weeks, by practitioners trained in twin pregnancies, and with the necessary time devoted to each foetus. In this Institution, the referral curves for foetal growth used in twins are the same as those used in singletons. The decisions for inducing delivery or for scheduling Caesarean section in the case of foetal growth retardation are those used in singletons, including the Doppler of umbilical and cerebral arteries and the foetal cardiac rate. Gestation duration measurement is based on a first trimester ultrasound, carried out for all early subjects as well as for singleton mothers, and available for 95% of referred or transferred women. For all women the chorionicity is defined during the first trimester ultrasound scan, upon pathological study of the placenta, or using genetic techniques if necessary.

The rate for newborn admittance to neonatal intensive care is stated, as is the average duration of stay in the NICU. Outcomes and specifically neonatal deaths are presented. An analysis of the department recruitment trends in the same three categories for singleton births is presented for the year 1998 (Table 1).

Results

The number of early subjects recruited varied between 80 and 127 per year, with a total of 610 in the 6 years from 1993 to 1998. During the same time the number of referred subjects totaled 554, while transferred subjects totaled 119.

Analysis of risk factors among twin pregnant women by mode of follow up does not show any significant differences in age of the mother, or in previous history of adverse obstetrical outcome. The early subjects show a high proportion of history of infertility, a high proportion of surgical and medical intervention, and a high proportion of use of assisted reproduction techniques. But all mothers of twins (early, referred and transferred) show significant differences compared to singleton pregnant women. These differences include a comparatively smaller number of previous pregnancies, a much higher proportion of history of infertility and a higher incidence of infertility treatment. However, no differences in age were found, nor were there differences in country of birth of the mother (European France, or French West Indies, or North Africa or sub Saharan Africa).

Foetal deaths are categorised by recruitment group and by gestation duration (Table 2). A higher proportion of foetal deaths is observed in referred and transferred cases, mostly related to foetal abnormalities in referred cases, and related to the severity of disease of the mother in transferred cases.

The global result of 21 still births per 1000 is deceptive and can be explained by recruitment bias. For example, 24 of 33 foetal deaths observed are among the referred or transferred women. A much more precise outcome measure is given by the result in foetal deaths for early subjects, with 9 deaths per 1000 twin births (Table 2). The analysis of foetal death shows that, unlike singleton pregnancies, progression in gestation age produces no reduction in risk. The analysis of gestation duration distribution in Table 3 shows the very different risk for delivery from 22–27 weeks by recruitment group.

The total percentage of preterm births from 22–27 weeks is 3.6%, but this figure is not equally represented in the three groups of mothers (Table 3). The percentage for early subjects drops to 2.2% after the

Table 1

Gestation Duration for Singleton Births, by Recruitment Group, 1998, Port Royal Level III Referral Centre

	Early subjects		Referred for advice		Referred for intra-uterine transfer		Not followed		Total	
	N	%	N	%	N	%	N	%	N	%
22–27	7	0.2	2	1.3	32	19.5			41	1.3
28–32	30	1.1	11	6.9	62	37.8			103	3.3
33–36	104	3.7	6	3.8	22	13.4	2		134	4.3
37 +	2653	94.9	140	88.0	48	29.3	16		2857	91.1
TOTAL	2794	100.0	159	100.0	164	100.0	18	100.0	3135	100.0
%		89.1		5.7		5.2		0.5		100.0

exclusion of referred cases. The rate of births from 28–32 weeks is further modified by recruitment bias. For the whole sample, the percentage for 28–32 week births is 15.3%, but is only 8% in early subjects. Furthermore, referred or transferred mothers account for over 50% of twin births from 22–32 weeks.

The distribution of birth weights among live births by recruitment group is given in Table 4. Once again, recruitment mode accounts for major differences in the rate of very low birth weight in newborns. Neonatal deaths among live born twins are described in Table 5. However, recruit-

ment bias is too strong in this situation for the figure of 30.7 per thousand to be accurate.

Half or more of all twin neonatal deaths are from the small group of extremely preterm births, that is, 22–27 weeks. This figure is measured for all twin newborns but is most evident in the group of early subjects. Of 21 neonatal deaths for this group, 13 occurred before 28 weeks. The opposite seems to be the case for transferred subjects, with only 8 of 22 deaths occurring between 22–27 weeks. This, and the sharp rise in this group's deaths from 28–32 weeks can be explained the relatively high number of transfers of women to the department after 27 weeks and between 28–32 weeks.

The number of days spent in neonatal intensive care is shown in Table 6 for all twin births compared to those resulting from extremely preterm birth. Of the 1209 live births of early subjects, 249 babies were transferred to NICU. The total number of NICU days equaled 5032, with the mean duration of stay equaling 20.3 days ± 26.6. For extremely preterm births in early subjects, 27 babies were admitted to NICU. For these 27 babies, the total number of days spent in NICU was 790, and the mean duration of stay jumped to 79.0 days ± 53.7 per newborn. These figures reveal that 15.7% of all days in NICU for early subjects' twin pregnancies were accounted for by the small group of live births from 22–27 weeks. The same is shown for referred and transferred twin mothers, for whom 20.5% of all NICU days were needed for the very small group of 29 neonates born at 22–27 weeks.

Table 2
Foetal Deaths Among Twin Pregnancies by Recruitment Group and by Gestation Duration (Weeks) at Birth Port Royal Maternity Paris — 1993–1998

Gestation duration	RECRUITMENT GROUPS			Total
	Early subjects	Referred	Transferred	
22–27	2	1	2	5
28–32	2	0	8	10
33–36	2	6	0	8
37 +	3	6	1	10
TOTAL	9	13	11	33
Rate / 1000 births	9 / 1220	13 / 108	11 / 238	33 / 1566
%	7.4	120	46	21

Table 3
Gestation Duration (Weeks) in Twin Pregnancies — Live Births by Recruitment Group, Port Royal Maternity — Paris — 1993–1998

Gestation Duration	RECRUITMENT GROUPS							
	Early subjects		Referred		Transferred		Total	
	N	%	N	%	N	%	N	%
22–27	27	2.2	3	3.1	26	11.4	56	3.6
28–32	97	8.0	12	12.6	125	55.1	234	15.3
33–36	453	37.5	40	42.1	58	25.5	551	36.0
37 +	632	52.3	40	42.1	18	7.9	690	45.1
TOTAL	1209	100.0	95	100.0	227	1000	1531	100.0

Table 4
Distribution of Birth Weight in Twin Live Births by Recruitment Group, Port Royal Maternity — Paris — 1993–1998

Gestation Duration	RECRUITMENT GROUPS							
	Early subjects		Referred		Transferred		Total	
	N	%	N	%	N	%	N	%
500 to 999	26	2.1	5	6.2	38	15.7	69	4.5
1000 to 1499	72	5.9	9	11.2	77	31.8	158	10.3
1500 to 1999	140	11.6	10	12.5	56	23.1	206	13.4
2000 +	971	80.2	56	7.0	71	29.3	1098	71.6
TOTAL	1210	100.0	80	100.0	242	100.0	1533	100.0

Table 5

Neonatal Deaths (0–27 Days) in Twins by Recruitment Group, Port Royal Maternity — Paris — 1993–1998

Gestation duration	RECRUITMENT GROUPS			Total
	Early subjects	Referred	Transferred	
22–27	13	2	8	23
28–32	7	1	14	22
33–36	0	0	0	0
37 +	1	1	0	2
TOTAL	21	4	22	47
Rate / 1000 births	1209	95	227	1533
%	17	42	97	30.7

Discussion

Global recruitment of the centre in comparison to twin mother recruitment can be observed by comparing 1998 figures for singleton pregnancies. Of 3135 singleton births, 89.1% were women followed since the beginning of pregnancy, 5.1% were referred to the centre, and 5.2% were transferred. Of these 3135, the pregnancies of only 0.5% were not followed (*n*=18).

The specific nature of recruitment for single pregnancies in this department can be demonstrated by the fact that of 41 births before 28 weeks in 1998, only 7 were from early registered mothers, while 34 were from referred or transferred mothers. Furthermore, of 103 28–32 week singleton preterm births, only 30 were from early mothers. If adverse obstetrical history of the patient is considered, early registered single mothers may not be at low risk of preterm delivery, but certainly appear to be so when only these results are observed.

The rate of preterm births among singleton pregnancies of 5.1% is only slightly higher at Port Royal than the rate of preterm births for all deliveries in France in 1995 which was 4.6% for singleton births (Bréart, 1998). The rate of extremely preterm births (22–27 weeks) acts as a measure for quality of twin prenatal care. Success in applying preventative measures against extremely preterm births was responsible for the remarkable reduction in neonatal deaths in a longitudinal, population based program in Glasgow. This success was followed by the proposal of a twin clinic,

offering an adapted program of prenatal care and prevention especially for twin mothers (Osbourne & Patel, 1985).

One such specific program for the prevention of preterm births in twin pregnancies was set up in France in the 1980s. The program focuses on very early intervention, from as early as 20–22 weeks. A specific program for prevention of preterm births adapted to twin pregnancies was established in France in the 1980s and has been focussed on a very early intervention at around 20–22 weeks. The results have been measured in a population study in the district of Haut de Seine, near Paris in 1989–1991 using 531 twin pregnancies. There was no control testing, as all twin mothers were exposed to the same information and the same proposal of early work leave. The results showed no difference in the rate of preterm births across socio-economic levels, and very low rates of birth between 22–27 weeks. (Papiernik, 1996). When compared with population-based data from a northern region of England, the Haut de Seine study showed fewer births from 22–31 weeks (Lowry, 1988). Furthermore, neonatal deaths were less frequent in Haut de Seine at 11 per 1000 versus 27 per 1000 in England.

We were not able to conclude whether our very early intervention program for prevention was or was not effective for this comparatively low rate of extremely preterm births, as the information about risk of twinning and the reduction of work load were proposed to all twin mothers. Further comparison is not easy with very large data collections such as those of United States National

Table 7

Neonatal Deaths (0–27 Days) Among Twin Newborns by Recruitment Group and by Gestation Duration (22–27 Weeks)

	Live births	Neonatal deaths	
		<i>N</i>	%
All twin live births			
Early subjects	1209	21	17
Late referred or transferred mothers	322	26	80
Births at 22–27 weeks of GA			
Early subjects	27	13	480
Late referred or transferred mothers	29	10	345

Table 6

Days in Neonatal Intensive Care for Twins All Births versus Preterm Births (22–27 Weeks) by Gestation Duration and by Recruitment Group, Port Royal Maternity 1993–1998

	Live Births		Transferred to NICU		Mean days in NICU	Total NICU days
	<i>N</i>		<i>N</i>	%		
All twin newborns						
Early subjects	1209		249	(20.3)	20.29–26.7	5032
Late referred or transferred mothers	322		223	(69.3)	29.26–28.75	6525
Extreme preterm 22–27 weeks						
Early subjects	27		27	(100)	79.0–53.7	790
Late referred or transferred mothers	29		29	(100)	74.2–33.8	1336

Data, where publications only show births at 26 and 27 weeks (Kiely, 1998).

Hospital based data collections (e.g., Chervenak, 1994) are extremely biased due to the high representation of referred cases. Moreover, no analysis was proposed to separate the representation of early registered mothers as opposed to those sent to the centre due to emergency complications (Chervenak, 1994).

Conclusion

The proportion of extremely premature live births has great importance when measuring the global outcome of twin pregnancies. More than half of all neonatal deaths are from these few births and 17% of all neonatal days in NICU were needed for this very small group of twin babies. Prevention programs for twin mothers should be designed that enable intervention in early pregnancy to reduce extreme preterm births. The rate of extreme preterm births (22–27 weeks) in twins is proposed as a quality marker for the effectiveness of prenatal follow up of twin mothers.

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